TRAFFIC ENGINEERING

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ON STREET AND HIGHWAY TRAFFIC

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A DIGEST OF CURRENT LITERATURE

148. OPERATING SPEEDS AND SPEED ZONING. Harry H. Harrison, Traffic Engineer, Illinois Division of Highways (Rural Traffic Problems, Highway Research Board January, 1939)

Probably the most common fallacy held today by uniformed traffic officials is in the maximum rate of speed at which the average motorist operates his car. It seems to be the general opinion that speeds above 60 m.p.h. are common. This belief results in a misconception of the problem and forms the basis for misdirected effort in exercising reasonable control of speed. Particularly has this been demonstrated by former State legislatures in fixing the maximum limits and in the failure to enact legal measures empowering traffic authorities to revise statutory limits to conform with the degree of hazard.

The nation-wide situation as found by the National Safety Council Speed Committee during the first year of research is as follows: All states have the basic speed rule requiring that no person shall drive a vehicle at a speed greater than is reasonable and proper. However, from there extends a very great spread of maximum miles per hour limits. Sixteen states have no rural maximum limit; 1 state 25 m.p.h.; 1 state 30 m.p.h.; 4 states 35 m.p.h.; 5 states 40 m.p.h.; 11 states 45 m.p.h.; 8 states 50 m.p.h.; 1 state 55 m.p.h.; 1 state 60 m.p.h.

About two years ago prima facie speed limits were posted on approximately 1650 miles of city streets in use as state highways in Illinois. Before the signs were erected, studies were carried on in more than 4000 zones in 865 cities to determine the location of the zone limits and the extent of needed revision of the statutory limits. In order to avoid being unduly influenced by prevailing speeds, no samples were taken prior to establishing the zone limits. The principles of graduated speed zoning were employed by state-traffic engineers in determining the prima facie limits and the statutory classifications of business, residence and suburban zones were largely forgotten. In arriving at the safe speed values, such criteria were used as the volume and class of traffic; the accident experience; pedestrian interference;restrictions in sight distance;intersection control; and the roadside development. While no formula has as yet been developed into which these values may be substituted to determine the safe speed, a thorough knowledge of all

factors is essential. It must be borne in mind that it is important to give some consideration to the opinions of local officials as to the speeds to be posted in order to obtain cooperative enforcement.

Zoning of relatively long sections of rural highways for safe speed has been undertaken in a few states. In most instances the need for such control has been evident because of the frequency, severity, or type of accidents. The principal factors which govern rural speed zoning are topography, alignment, pavement type, width and condition, the prevailing speed of traffic, and the accident records. Such other factors as traffic density, weather, and light conditions are variables that to a great extent must be omitted and dependence placed on the judgement of each motorist in fixing safe speed.

Speed zoning has been defined as being "the application of speed limits to streets and highways which under average conditions represent the rate at which it is safe to drive." This definition should be qualified by the further provision that such limits, to be acceptable, must be determined by an engineering investigation of the traffic and physical conditions prevailing on each street and highway.

149. THEY SHALL NOT PASS. Donald S.Berry,Traffic Engineer, National Safety Council. (Public Safety, April '39)

No Passing Zones on hills and curves of short sight distance are the subject of experimentation in a great many states today.

There are three distinct types of paving markings for the zones. These are (1) a single solid line painted on the center line for the entire length of each zone, (2) a double line on the center line, and (3) separate lines for each direction, painted alongside the center line, with each line ending at the point where the road ahead becomes visible to the motorist.

Zones of the first two types are unnecessarily restrictive. The third type of No Passing Zone provides no more restriction than absolutely necessary for safety, since motorists are permitted to start a passing movement as soon as they can see ahead a sufficient distance.

The joint committee on Uniform Traffic Control Devices of the National Conference on Street and Highway Safety has revised its standard for No Passing Zone markings, and provides for the third type of zone.

States using this new standard method do not interpret

the beginning of the zone in the same manner. The beginning of the zone should really mark the point prior to which all passing movements should be completed, and motorists should be asked to be in single line before entering the marked zone.

There are many problems yet to be solved in standardizing No Passing Zone markings.

150. A TRAFFIC SURVEY. Otto K. Jelinek (Chicago Park District Traffic Engineering Section)

Volume I: Summary, Scope and Methods. This is a final report of "A Traffic Survey" sponsored by the Chicago Park District in cooperation with the W. P. A.

This excellent report, with 84 illustrations, 10 tables, and 214 pages of text, summarizes the work performed and the kinds and types of traffic data that were gathered.

The volume is divided into eighteen chapters, each devoted to a separate phase of the surveys undertaken. Most of the chapters are replete with illustrations pertinent to the subject considered and highly informative as to the successful measures the Traffic Engineering Section employed to overcome various traffic problems in Chicago Park District.

Appendix to Volume I: Summary, Scope and Methods. This volume contains reproductions of the final forms developed and used by the Traffic Engineering Section of the Chicago Park District in gathering and compiling data.

Eighty-three forms for 24 traffic phases are included. These forms were used for compiling, summarizing and preparing data into proper shape for statistical treatment.

This appendix will also prove to be of valuable assistance in designing and improving whatever new and additional field and office forms may be needed to conduct other phases of a traffic survey. The text, spacing arrangements, and checks and cross checks provided in the forms reproduced may well be used to serve as models for any other forms needed for gathering and compiling different kinds of data.

151. DOES MY CITY NEED A TRAFFIC ENGINEER? Theodore M. Matson, Research Associate, Yale Bureau for Street Traffic Research. (American City, April, 1939)

Recent accident statistics show that approximately 7 out of every 10 people are killed in traffic lose their lives

in rural areas or in municipalities under 10,000 population. This evidence alone seems to show conclusively that the traffic problem is primarily one coming under the jurisdiction of the state. Adequate administrative machinery should be set up by the state government to assist small cities and rural areas in reducing accidents, for traffic control and management are needed in every town.

Most small cities have a state highway running through them, and all too frequently this highway passes through the business district. Here will be found severe congestion caused primarily by residents of the surrounding territory doing business with local merchants.

The author believes that competent advice should be furnished and applied in exactly the same manner as the state department of health would deal with an epidemic disease. No city of less than 10,000 population can afford to employ, or efficiently employ, the full-time services of a competent traffic expert, and it is questionable whether there is a sufficiently well-trained personnel available today to supply such a demand. Small communities must depend on state traffic advice.

The question may well be asked,what size city can properly utilize the full time of an experienced traffic engineer? The answer depends on topography, volume of through traffic, character of enterprises, and many other factors. Certain cities of 50,000 population could use a traffic engineer on full time.

Responsibilities of the Community. Small communities seldom undertake broad traffic-improvement programs, but look to the state highway patrolman and the motor vehicle bureau to keep order on the state highways passing through these communities. Where else can they turn for intelligent guidance in traffic regulation and traffic equipment? The proper routing of state highways is a vital factor in solving the traffic problem of the small community.

In the middle-size town where traffic problems are more complex,the police department and the engineering department should work hand-in-glove on traffic matters. Someone in the police department should be assigned to specialize along traffic lines. An assistant engineer in the engineering department should work with this police officer. Working together, these two men, given public cooperation, money and advice from the state traffic authority, can render valuable service to the community. The larger the city, the more these men will specialize on enforcement and engineering measures.

In the large city, we find a special branch of the police

service with only traffic work to do, headed by a captain or inspector with city-wide powers to supervise and carry out all matters pertaining to traffic-law enforcement and the fundamental fact-finding and analysis pertaining thereto. The city traffic engineer now requires a corps of assistants to handle complaints and to solve difficulties.

152. CAN WE SOLVE OUR ACCIDENT PROBLEMS? Wilbur S. Smith, Traffic Engineer, South Carolina State Highway Dept. (Paper presented at S. C. Claim Men's Ass'n)

In South Carolina, accidents reported on State highways in 1925, the first year in which accident reports were collected from Highway Patrolmen and Maintenance employees, claimed 131 deaths. The fatality toll mounted to 376 in 1936, decreased slightly in 1937 to 312, and again in 1938 to 309. These figures exclude all accidents other than those on State highways.

Analysis of causes shows that personal faults of operators are responsible for 66 per cent of all accidents, 45 per cent of the fatal mishaps. Ten per cent of all accidents and 31 per cent of the fatal accidents are attributed to pedestrian blunders. Mechanical failures were classed as the main factor in 10 per cent of all accidents, 11 per cent of the fatal accidents.

For reduction of the accident toll, more stringent driver control is advocated, through rigid driver licensing, passage of financial responsibility laws to control the accident prone or irresponsible driver, complete accident reporting enforcement, where and when necessary, and education.

The definite participation of the highway in the causation of accidents appears very slight. Less than 1 per cent of all accidents reported is attributed to fault of the roadway, and only 0.5 per cent of the fatal accidents.Ninety per cent of the accidents occur on straight, level, dry roads during daylight. However, this cannot be taken as a measure of the relative hazard of straight roads, curves and hills, and tangents, or of day and night, or wet and dry surfaces. The proportion of accidents on curves is about twice as great as on tangents, considering the relative mileage of curves and tangents. Also, approximately 50 per cent of the fatal accidents occur at night, yet only about one-fourth of the total volume of traffic on the highways during hours of darkness.

Mechanical inspection and design improvements are supported to lower the responsibility of the vehicle. Highways must be made as nearly foolproof as possible. The safety

features of grade separations, medial strips, sidewalks in rural areas, pedestrian crossings,and other designs currently in use, cannot be minimized. Redesign should take place as soon as the economic consideration will allow.

Highway lighting has shown its tremendous influence on safe night travel. Rural areas are being greatly aided by reflector markers of many types which have proved of considerable worth as well as being economical.

Through traffic engineering, it is possible to approach problems with a basis of facts rather than opinions. The 1938 nationwide decrease has indicated that, with the use of sound engineering remedial methods, the problem of accidents on streets and highways can be conquered.

153. NEW JERSEY'S LIGHT REFLECTING CONCRETE CURB. H. W. Giffin, Engineer, Survey & Plans, N. J. State Highway Department. (American City, April, 1939)

New Jersey's Highway Commissioner, E. Donald Sterner, faced with the problem of securing greater safety for millions of night motorists, recently approved experimental designs of curbing which reflect light from the headlights back to the drivers eyes,thereby making the curb visible,and has authorized construction of several miles of such curb flanking the center islands of divided roadways and the outside edges of roadways.

These curbs are called "Reflecting Curb"and are constructed either in precast units or by the cast-in-place method. There are two types--(1)a slant or sloping curb flanking the center islands of divided roadways and channelizing islands at intersections; and (2) a vertical curb similar to the ordinary curb in city streets.

The principle of light reflection is the same in either type. Smooth faces normal to the headlight's rays and drivers vision are provided by means of either a saw-tooth profile or depressed panels in the surface of the curb. These faces are so close together that continuous band of reflected light is presented to the driver's view, similar to that of a while picket fence viewed at a flat angle.

It is especially noteworthy that the effectiveness of the curb actually increases on rainy nights because the film of water flowing over the reflecting faces increases the intensity of reflection. The latest models of precast curb produce a gleam that appears much like a series of reflector buttons set in pairs on the whole length of the curb. The theoretical range of this gleaming line is from 75 feet to

250 feet.

Although both the precast and cast-in-place methods are used, the precast method appears to give better results in the construction of slant curb because of the smoother denser surfaces produced, and also because the angle of the reflecting faces is absolutely controlled by the mold. The vertical curb is cast in place against a side form which itself constitutes the desired mold.

In either type curb, the exposed surface embracing the series of reflecting faces is made of white concrete 2 inches thick in cast-in-place curb, and $\frac{1}{2}$ to 1 inch thick in precast curb. Both are backed up by grey concrete. The mix specified for precast curb is 1 to $5\frac{1}{4}$ with a ratio of fine to coarse aggregate between 50 and 67 per cent, the fine aggregate being a white quartz sand. The mix for cast-in-place curb is 1:1 3/4:$3\frac{1}{2}$.

This work is all new, to the present, but the curb has already been specified in 18 contracts covering 40 miles of road, now more than half completed.

154. TRAFFIC TUNNEL LIGHTING.--Wellington, New Zealand

The problem of satisfactory lighting the Mount Victoria Traffic Tunnel, Wellington has been overcome by the installation of 45 sodium discharge lamps - 150 watt Philora, each giving 9000 lumens.

This tunnel is on the main artery serving the Eastern Suburbs (population 27,000) and carries 5,800 vehicles per 10 hour day (8 A.M. to 6 P.M.) which volume has increased from 2900 vehicles per 10 hour day in 1932. The tunnel is 2045 feet long and provides for two lanes of traffic with a single footpath physically separated from the carriageway.

Apart from the cost, the lighting of the tunnel offered three main problems: (1) low ceiling of tunnel - only 18' 6"; (2) accentuated light contrasts when passing in and out of the tunnel on account of high, light coloured cuttings at both portals; (3) the desirable prohibition of the use of head lights in the tunnel.

The low ceiling meant special fittings; No. 2 meant increased illumination near the portals and No. 3 meant materially reduced lamp spacing intervals.

During the hours of darkness alternate lamps only remain lit.

The general city speed limit of 30 m.p.h. is reduced to

20 m.p.h. in the tunnel and the overtaking and passing of motor vehicles prohibited.

155. TRAFFIC SURVEY OF THE CITY OF BUFFALO. William B. Powell, Traffic Engineer, Police Department

The 1938 Traffic Survey of the City of Buffalo, New York, was conducted under the technical direction of William B. Powell, Traffic Engineer, Buffalo Police Department. Assistance in the preparation of these materials was furnished by the personnel of the Works Progress Administration.

Highlights of this report in the way of recommendations are: Appoint a Traffic Engineer with a staff of assistants; Increase equipment appropriation to modernize physical plant; Establish progressive movement on main arteries devoid of street cars, favoring heavy traffic direction at peak hours; Use three phase timing at irregular and multiple intersections; Standardize all signs in accord with Manual of Traffic Control Devices; Equip all STOP signs with reflecting-elements; Use movable standard STOP signs at school crossings instead of pedestals in roadway; Mark entire area of safety zones with white cement at pavement level.

The scope of the Survey included a complete study of volume, parking, speed, accidents, control devices, schools, and enforcement. Many interesting facts were brought out in each of these studies.

Numerous suggestions were also made for street pavement, corner and street extension, railroad crossings, waterway crossings, and new roads.

The Survey is replete with maps, charts and tables, and a full set of excellent conclusions.

156. SAFE SPEED SIGNS MARK OHIO CURVES. (American City, April, 1939)

Safe-speed reflectorized signs at all curves on State Route U. S. 40 in Ohio have been ordered by Highway Director John Jaster, Jr. Although these are speed-suggestions and not speed-limit signs, their observance should insure a much greater degree of safety to the motoring public. Says Traffic Engineer Harry E. Neal: "Curves are one of the greatest single hazards of our highways, but the standard curve signs give no indication as to the rate of speed at which the curve may be negotiated safely. These safe-speed signs will be mounted below the curve-warning signs on the same posts.

NEWS ABOUT THE TRAFFIC ENGINEERING PROFESSION

NATIONAL INSTITUTE FOR TRAFFIC SAFETY TRAINING TO BE HELD. With traffic engineering assuming increasing importance in the continuing effort to assure more efficient and safer use of the highways, the second National Institute for Traffic Safety Training to be held at Ann Arbor, Michigan, August 14 to 26, offers traffic personnel a unique opportunity to keep abreast with modern techniques and advances in meeting modern conditions.

This statement was made by Leslie J. Sorenson, President of the Institute of Traffic Engineers, in announcing that the organization will again be one of the sponsors for the Ann Arbor Institute and will actively participate in the two weeks program. The initial Institute was held at the University of Michigan, August 8-20, 1938, and set a precedent for constructive training methods.

Mr. Sorenson urges traffic engineers throughout the country to cooperate fully in bringing the Ann Arbor Institute to the attention of members of their staff, sending personnel and in generally furthering the purposes of the two weeks training period.

17th ANNUAL MID-WEST SAFETY CONFERENCE. The 17th Annual Mid-West Safety Conference will be held at the Sherman Hotel May 9, 10, and 11.

Tuesday, May 9, 2:00 P.M.--Public Safety, Education - William C. Knoelk, Chairman. Wednesday, May 10, 9:30 A.M.--Public Safety, Enforcement - Judge John Gutknecht, Chairman. Wednesday, May 10, 12:15--Public Safety Luncheon - Leslie J. Sorenson, Presiding. Wednesday, May 10, 2:00 P.M.--Public Safety, Engineering - Sidney J. Williams, Chairman. Thursday, May 11, 9:30 A.M.--Public Safety - Professor Roger L. Morrison, Chairman.

President Sorenson urges that as many Institute members as possible attend.

PROFESSOR C. C. WILEY. Professor C. C. Wiley, Engineering College, University of Illinois, was recently selected by the Illinois Legislative Committee to serve as consulting engineer and guide to the Illinois State Highway Department-Construction and Maintenance Program. We are pleased to

hear that this honor has been bestowed upon Professor Wiley.

TRAFFIC SAFETY FELLOWSHIPS. The Automotive Safety Foundation has just announced the 1939 Alfred P. Sloan, Jr. Traffic Safety Fellowships which will be available to State Enforcement Officers and Engineers of State Highway Departments. The awards consist of 19 fellowships to provide an academic year's training in the specialized fields of traffic control, as follows:

1. Twelve police officers at Northwestern University Traffic Institute. $1200 each for living expenses field travel and tuition.

2. Seven Traffic Engineers at Yale Bureau for Street Traffic Research. $1400 each for living expenses field travel and tuition.

Applicants for traffic engineering training at Yale Bureau for Street Traffic Research shall be engineering employees of state highway departments between the ages of 21 and 30 to whom will be granted the necessary leave of absence from their positions.

Applications and detailed eligibility requirements may be secured from Maxwell Halsey, Associate Director, Yale Bureau for Street Traffic Research, New Haven, Connecticut.

ARNOLD H. VEY. Arnold H. Vey, Traffic Engineer, Motor Vehicle Department, State of New Jersey, has become the Chairman of the Department of Traffic for the Highway Research Board of Washington, D.C. This is an honor and we wish him good luck in his new committee assignment. The majority of the Members serving on Mr. Vey's committee are also members of I. T. E.

SEATTLE ANNUAL REPORT. Last week the Institute received from J. W. Arch Bollong, Traffic Engineer, Bureau of Streets,-Seattle a copy of the 1938 Annual Report. This report covers the activities of the Traffic Control Division of Seattle. It is most comprehensive. Not only does it cover in detail the work of the Traffic Engineering Department for 1938, but also contains a number of far reaching traffic engineering recommendations for adoption in 1939. The report is well illustrated, containing accident facts, photographs of traffic conditions, plans for a limited way bypass, graphs of traffic control installation and maintenance.

P. S. How about some of you other city and state traffic engineers sending in similar reports for the I.T.E. library?

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ACT II	The same—but the morning of two days later
ACT III	Still the same—but late, late that night

Written by Hallie (Shakespeare) Myers

GENTS of the CAST in order of appearance

	Played by
Chief John F. (Flatfoot) Floogie Chief of Milltown, U.S.A.	Lieutenant Phillip H. Edwards
R. E. Porter 1-Star (*****) Reporter, Milltown Bugle	K. M. Hoover
Patrick Murphy Sergeant, Milltown Police Force	Edward Eames
Laurence (High Hurdles) Tipton, B.S. and B.B.S. Nathan Cherniack Professor of Athletics, Ruggers University	
Alden Welch Ghost Writer, Greater American City Magazine	Arnold Vey
Paul Green Sales Assistant, Manual Signal Corporation (a non-profit organization)	Merwyn A. Kraft
Earl J. Reeder Traffic Insultant, Pango Pango, Samoan Islands	Irving J. Mack
Hawley S. Simpson Hostler, American Horse Car Association	John Paver
John Gibala Traffic Engineer, Greater New York World's Fair	Eugene A. Barton

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PROGRAM OF THE EASTERN REGION BANQUET OF I.T.E.

Dr. Ralph H. Blanchard, Professor of Insurance at Columbia University spoke at the New York Regional Banquet of the I. T. E. March 27. His topic, "Insurance and the Traffic Problem" stressed the need for financial responsibility on the part of all drivers or owners of automobiles and recommended general compulsory insurance as going farthest to accomplish this end.

The New York Times in an editorial said: Before the Institute of Traffic Engineers, meeting in connection with the annual safety convention... Although there is a good deal to be said in favor of properly safe-guarded compulsory insurance, or for compensation insurance as applied to motor vehicles, if provision is made for adequate recovery, in aggravated cases, beyond the standard rate, the method by which universal insurance is provided is of less importance than the establishment of financial responsibility for those who operate motor vehicles, before and not after the accident occurs.

Those unable to attend the Banquet missed a real show. In addition to Professor Blanchard the group were entertained by a fast moving panorama of "Blown Fuses and Cracked Lenses." The gentleman who played an important part in ar-

ranging the program and directing the aspiring thespians was none other than our good friend PAUL L. GREEN. A wave of acclamation spread among the audience and it was agreed that Paul Green had pulled another "Belasco."

TRAFFIC ENGINEERING IN FLINT, MICHIGAN. Henry W. Osborne, Traffic Engineer of Flint reports that newly created position is an excellent one. The engineering division has been set up independent of all other functions of the police, and directly responsible to the Chief of Police. The Chief of Police is, in turn, directly responsible to the City Manager.

SIDNEY J. WILLIAMS. On April 12, Sidney J. Williams received the annual award of $5000 given by the C.I.T. Safety Foundation. Mr. Williams, in winning the award, had in the opinion of competent judges contributed the most toward the highway safety movement.

This is the second I.T.E. member to win this award in the past three years. We pay our respects to Sidney and are pleased to see that he will continue to march in the ranks of Safety for many years to come.

TRAFFIC ENGINEERS TAKE NOTE! Mr. John Beakey, Traffic Engineer of the Oregon State Highway Department has submitted, the following poem taken from the "Portland Oregon Journal."

If we really want to stop him
In his march across the map,
If we're anxious to provide him
With a major handicap;

Then I offer the suggestion
That to Germany's frontiers
We dispatch a half a dozen
Of our traffic engineers.

Let them sell him all their signals,
Islands, zones and yellow lines,
Meters, semaphores and buttons,
Lanes and lights and stripes and signs.

If this doesn't make a tangle
That Der Fuehrer can't unravel
I will bet when he gets through them
He'll have lost his zest for travel.

H.S.G.

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THE OBJECTIVES OF THE INSTITUTE

The objects of the Institute shall be the advancement of the art and science of traffic engineering, the fostering of traffic engineering education, the stimulation of original research in traffic engineering, the professional improvement of its members, the encouragement of intercourse between men with mutual interests in traffic engineering, and the establishment of a central point of reference and union for its members. (Article I, Section 4 of the Constitution of the INSTITUTE OF TRAFFIC ENGINEERING).

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